

REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 77-98 are currently pending. Claims 49-76 have been canceled without prejudice; and Claims 77-98 have been added by the present amendment. The additions to the claims are supported by the originally filed specification and do not add new matter.

In the outstanding Office Action, Claims 64, 67-70, and 74-76 were objected to regarding various informalities; Claims 51-53, 56-59, 62-64, 73, and 74 were rejected under 35 U.S.C. §112, second paragraph, for being indefinite and unclear; Claims 73-76 were rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement and the enablement requirement; Claims 49-51, 54, 60-62, 65, 71, and 72 were rejected under 35 U.S.C. §103(a) as being unpatentable over European Patent Application No. EP 0702467 to Ballarin et al. (hereinafter “the ‘467 patent”); Claims 52, 53, 63, and 64 were rejected under 35 U.S.C. §103(a) as being unpatentable over the ‘467 patent in view of U.S. Patent No. 5,991,289 to Huang et al. (hereinafter “the ‘289 patent”); Claims 73-76 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,812,523 to Isaksson et al. (hereinafter “the ‘523 patent”) in view of the ‘467 patent; and Claims 55 and 66-70 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form.

Applicants respectfully submit that the objections to the claims are rendered moot by the present cancellation of Claims 49-76.

Applicants respectfully submit that the rejections of the claims under 35 U.S.C. §112 are rendered moot by the present cancellation of Claims 49-76.

Applicants respectfully submit that the rejections of the claims under 35 U.S.C. §103(a) are rendered moot by the present cancellation of Claims 49-76.

The present amendment also sets forth new Claims 77-98 for examination on the merits. New Claims 77-98 are supported by the originally filed specification and do not add new matter.¹ New independent Claims 77 and 88 correspond to cancelled independent Claims 49 and 60, while new Claims 78-87 and 89-98 correspond to canceled dependent Claims 50-59 and 61-70, respectively.

New Claim 77 is directed to a receiving apparatus for receiving signals in a digital communication system, comprising: (1) receiving means for receiving a reference symbol including a plurality of repetition patterns, wherein each repetition pattern includes a number of complex samples, the number of complex samples being the same in each repetition pattern, and wherein one of the repetition patterns is phase-shifted in relation to the other repetition patterns; and (2) synchronizing means for synchronizing the receiving apparatus in the digital telecommunication system using the received reference symbol, the synchronizing means comprising (a) correlation means for cross-correlating the reference symbol received in the receiving means, and (b) detecting means for detecting a phase of each of the plurality of repetition patterns in the reference symbol and a correlation peak that indicates a position of the phase-shifted repetition pattern. Further, Claim 77 recites that the detected phases of each of the plurality of repetition patterns and the detected correlation peak are used in the synchronizing means for synchronizing the receiving apparatus in the digital telecommunication system. New Claim 77 is supported by the originally filed specification and does not add new matter.²

The '467 application (and equivalent U.S. Patent 6,009,125 to Ballarin et al.) is directed to a digital transmission system including a receiver that can be synchronized with a transmitter using initialization sequences. As shown in Figure 4, the '467 patent discloses the

¹ See, e.g., Figures 6, 7, 9, and 11; page 4, lines 8-10; page 12, lines 20-21; page 13, lines 5-14; and page 14, lines 1-5.

² See, e.g., Figures 6, 7, 9, and 11, which show $y(i)$ as the input signal to the correlation means and page 4, lines 8-10, which defines $y(i)$ as a complex signal. See also pages 12-14 of the specification.

transmission of a reference sequence ABABABABCD CDCDCD for the detection of a correlation peak in the receiver. As shown in Figure 1, the '467 patent discloses that the symbols A, B, C, and D are points in the QAM4 constellation. However, the '467 patent fails to disclose the exact content or type of symbols in the constellation. Thus, Applicants respectfully submit that the '467 patent fails to disclose a reference symbol including a plurality of repetition patterns, wherein each repetition pattern includes a number of complex samples, the number of complex samples being the same in each repetition pattern, as recited in new Claim 77.

The '467 patent also discloses that the correlation means 30A, 30B is configured to precisely detect the moment of the transition between states AB and CD of the initialization sequence. As shown in the attached figure, when the reference symbol enters the correlator 30A, 30B, the output signal starts to increase and reaches its peak when the transition between AB and CD occurs. Afterwards the output signal decreases. However, Applicants respectfully submit that the '467 patent fails to disclose detecting means for detecting a phase for each of the plurality of repetition patterns in the reference symbol, wherein the detected phases of each of the plurality of repetition patterns and the detected correlation peak are used for synchronizing the receiving apparatus, as recited in new Claim 77. Rather, the '467 patent merely discloses the detection of a correlation peak, without the detection of the phases of each of the plurality of repetition patterns in the reference symbol, as recited in Claim 77. Accordingly, for the reasons stated above, Applicants respectfully submit that Claim 77 (and dependent Claims 78-87) patentably define over the '467 patent.

New independent Claim 88 recites limitations analogous to the limitations recited in new Claim 77. Accordingly, for the reasons stated above for the patentability of Claim 77, Applicants respectfully submit that new Claim 88 (and dependent Claims 89-98) patentably define over the '467 patent.

Thus, it is respectfully submitted that new Claims 77-98 patentably define over any proper combination of the '467 and '298 patents.

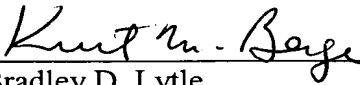
Consequently, in view of the present amendment and in light of the above discussion, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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Ballarin et. al

Phase 1

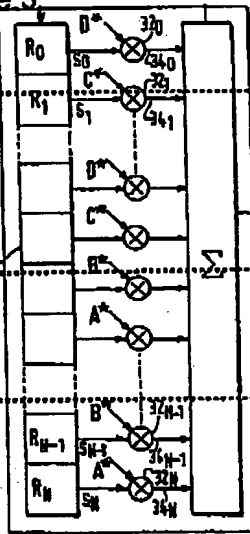
Phase 2

Phase 3

DCBABA BABA BABA

DCDCDCDCBABA BABA

DCDCDCDC BABA



Correlation result

